Financing Canadian Energy Resource Development

John A. Dawson

CANADIAN ENERGY RESEARCH INSTITUTE

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PREFACE

When the work of the Institute began, its first study examined the Availability of Capital to Fund the Development of Canadian Energy Supplies. Five years later the subject warrants a re-examination. Again, as in the earlier study, it is examined within the context of overall developments in the economy. The earlier work is updated and extended and in some instances additional sources of data are used. The implications of the National Energy Program and the subsequent Ottawa-Alberta and Ottawa-British Columbia agreements are also treated since they will have a dominant influence on energy developments throughout the remainder of the 1980s. Originally, it had been intended to push the time horizon on the study out to 2000. For the financing, however, too many changes have been taking place recently for one to attempt to say anything about the decade beyond the present one.

The study was carried out during the first nine months of 1981. I wish to express my appreciation to Dr. G. Angevine, the Executive Director of the Institute, and to two reviewers who read an early draft and made a number of suggestions for improvement, most of which I have been able to incorporate.

CHAPTER 1

INTRODUCTION AND SUMMARY

1.1 Introduction

In the 1950s Canada began to develop its oil and gas resources, to build pipelines and make other resource investments. From then until the early 1970s Canadians were living on cheap energy. The prodigious appetite for energy was met easily, either through domestic production or imports. During 1960 through 1972 our total energy use grew at an average annual rate of 5.6 percent while the economy grew at 5.4 percent. By 1972, of our total energy consumption, 44 percent was accounted for by petroleum products, 22 percent by natural gas, 9 percent by coal and 25 percent by electricity. During 1972 to 1977, with economic growth having slowed to an average rate of increase of about 3.8 percent, the rate of increase in energy consumption was cut to about 3.0 percent. In the period 1978 to 1980, inclusive, the rate of economic growth was dropping and averaged only 2.1 percent but energy consumption continued to rise at an average annual rate of 3.0 percent.

Looking ahead, most analysts believe that if the Canadian economy grows at an average rate of about 3.0 percent, the rate of growth in energy use could be reduced to 2.5 percent. Shifts in energy use will be taking place, with no increases occurring in oil consumption while above-average rates of increase will be required in the use of natural gas, electricity, coal and various forms of energy from renewable resources.

Also of significance in an examination of energy investments and their financing is the need to replace much of the existing oil production capacity which is based on depleting low cost conventional sources, with much higher cost sources, including non-conventional, northern frontier and east coast offshore production. Concurrently, if we are to move in the direction of oil self-sufficiency, it will be necessary to increase our oil production capacity. There are also major investments to be made in oil refining and in the

production, transportation and distribution of other forms of energy, all of which are more expensive to transport than oil.

Growing out of these realities, projections of energy investment indicate sustained high levels throughout the 1980s, far higher than anything Canada has experienced in the past. What are going to be the sources of finance for these investments and what are going to be the types of arrangements made to accommodate their financing? These are the questions to which this study is directed.

While energy investment can be seen in the broad sense as a requirement for the development of the Canadian economy in the years ahead, there have been a number of policy developments in recent years, culminating with the National Energy Program announced in late 1980 and the September 1981 Ottawa-Alberta Agreement on Energy Pricing and Taxation, that will have major impacts on how capital is raised and employed in developing sources of energy.

In the first sections of Chapter 2, the matter of growth and investment in the Canadian economy is addressed. Then, within this context, energy investments are considered. A review of what was anticipated and what actually took place between 1976 and 1980 is followed by an examination and discussion of various projections of energy investments over the period to 1990 that have been made by a number of analysts. In Chapter 3, I turn to the sources of saving and the types of financing that have been and are likely to be used for general investment in the Canadian economy. In Chapters 4 and 5, I examine the financing of energy investments, reviewing the recent past in Chapter 4 and looking ahead to the future in Chapter 5. A section is included on the implications of recent policy developments.

1.2 Summary

During the last half of the 1970s the Canadian economy, along with many other economies, fell off the growth ladder. The growth in GNP, which had been projected in 1975 at a potential rate of 5.7 percent for the 1976-80 period, actually turned out to average less than 3.0 percent. Not only has the actual rate of growth over the period turned out to be much lower than projected, but the level of investment in relation to GNP has also been lower, averaging 23.1

percent of GNP, which is below the 1956-75 long-term average of 23.5 percent. While energy investments have been high, at 19.6 percent of total fixed capital formation compared to the 1956-75 average of 14.9 percent, the proportion has been lower than projected. Some of the major energy projects that were expected to be underway before 1980 have been delayed. These delays were especially significant in the petroleum sector, where oil and gas exploration and development accounted for only 34 percent of total energy investment, and pipeline construction for just over 3 percent. Investment in electric power, which accounted for 54 percent of the total, was about what had been expected. However, with excess capacity building up by the end of the 1976-80 period, electricity investment was no longer being increased.

Looking ahead to 1990, most projections indicate an average rate of growth in the Canadian economy of 3.5 percent or less. The Economic Council of Canada's base case projection from its Seventeenth Annual Review, on which attention is focussed in this study, assumes very low rates of productivity increase and has an average rate of growth over the decade at below 3.0 percent. Heavy investment requirements through the 1980s are projected, rising to over 24 percent of GNP during the first half of the decade and to nearly 26 percent for the last half.

The total energy investments projected would amount to $100 billion in 1971 dollars over the period 1981-90. In current dollars, as spent, the total would be almost $400 billion. The proportion of the total that would be directed to the production of oil and gas would increase from 34 percent in the 1976-80 period to 47 percent over the first half of the 1980s and to 56 percent in the latter half of the decade. In this projection, petroleum industry investment is of sufficient magnitude to extend exploration and development in the north and off the east coast and to bring a number of major projects into production, including an extension of Syncrude, two new oil sands plants, and the completion of the Alaska Highway and Quebec and Maritime Gas Pipelines. The considerable increase in pipeline investments would bring their proportion of the total up to 10.7 percent in the 1981-85 period and to 5.4 percent in the 1986-90 period.

Projected investment for the expansion of electric power facilities, assuming no growth in investment in 1981 followed by a 2.0 percent per annum rate of growth for the remainder of the period, declines as a proportion of total energy investment from 54 percent during the 1976-80 period to 39 percent in 1981-85 and 35 percent in 1986-90. Additional energy investments projected, and included in the total, are coal mining (1.2 percent of the total over the decade) and petroleum and coal products manufacturing (2.4 percent). For each of these last two categories the projections may be on the low side.

A brief review of billion or multi-billion dollar projects under consideration in the energy sector--the mega projects--indicates that the list may total something in the order of $150 billion in current dollars. Because of their size and nature, however, these projects have implications for investment financing that extend beyond their significant proportion of total energy investment.

What are going to be the sources of financing for all of these energy investments? To finance energy investments in the economy along with the other business, residential, and government investments requires saving that comes from four main sources: the personal, corporate, government and non-resident sectors. As with total investment, total saving as a percentage of GNP will also have to be increased.

Personal saving, excluding contributions to the Canada and Quebec Plans which are included in the government sector, has been increasing rapidly. The increase is expected to moderate with the result that personal saving would account for a somewhat lower proportion of total saving than the very high level reached in the last few years. Corporate saving and capital consumption allowances are expected to account for about the same proportion as they have since the mid-1970s. Government saving, which includes contractual commitments under the Canada and Quebec Pension Plans from both employers and employees, is again expected to contribute to total saving as governments restrain their level of expenditures and the federal government moves closer to balancing its budget.

The remaining source of saving, that which is derived from non-residents, has become more significant in recent periods of heavy resource investments. There are differing views on the extent to which Canada will be dependent on foreign sources of funds for its investments over the period ahead. The Economic Council's projection indicates that the ratio of non-resident saving to the total will be about 9 percent in each of the two five-year periods under examination, up only slightly from an 8 percent average during 1976 through 1980 and considerably below the 15 percent average reached in the 1956-60 period.

In order to focus on the manner in which investments are financed, non-financial private corporations are examined in some detail. In 1979 they accounted for nearly half of the total fixed capital formation in the Canadian economy. Included in this figure are the firms that make most of the energy investments. A review of how non-financial private corporations as a group have adjusted their financing as conditions have altered in the economy over the past 15 years, yields insights which are valuable in looking ahead through the 1980s.

Generally, non-financial private corporations were able to rely on internal sources of funds, including undistributed profits and capital consumption allowances, to finance a considerable proportion of their total investments. External sources were used for about 40-50 percent of their total investment in financial and non-financial assets in most years. This proportion rose to more than 55 percent towards the end of those periods in which there were several years of rapid investment increases.

The extent to which various types of external financing were used--bonds, mortgages, stocks, loans, payables, and others--depends on whether or not a build-up in financing requirements had been taking place, and on what was happening to interest rates. In 1978 and 1979, for example, while the growth of the economy was slow, rates of increase in investment accelerated and the external financing requirements of corporations rose rapidly. Prices rose by 9 percent in each year and interest rates moved up. Long-term fixed investment financing (bonds and mortgages) dropped to where it accounted for only 5 percent of the total external net financing

requirement in 1979--the lowest ever. Stocks retained their share at about 20 percent. Loans extended their share to 26 percent, and other short-term forms of financing also increased in relative importance. In 1980, with the economy in recession and little increase in investment in real and financial assets, financing requirements grew slowly. No major changes took place in the distribution of the forms of financing although the role of bonds and mortgages increased slightly.

For the years ahead, if price increases decline and interest rates drop off from the record levels they reached in 1981, some recovery of bond financing may occur. If, however, uncertainties concerning future interest rates continue, so will the current aversion to bond issues with long terms and fixed interest rates. The field will be left to preferred shares and debentures that are convertible into common shares, and long-term variable rate loans. The institutions that provide the sources of the financing will also be undergoing changes; there will be a continuation of the increasing role for pension funds and other large pools of capital.

These general tendencies that influence the financing of overall economic activity will continue to influence energy sector activities. There are also, however, a number of special features pertaining to energy investments. They include:

- the location of investment, much of which takes place in isolated and frontier areas;
- the lumpiness of much of the investment, with a significant proportion being in mega projects;
- the generally long lead times between the beginning of investment and production; and
- the increasing role of governments, both as participants and as regulators concerned with pricing, revenue distribution, environmental and social considerations.

In addition, the financing of energy investments is heavily conditioned by the varying manner in which the two largest energy industries, petroleum and electric power, are

structured. Firms in the petroleum industry have been able to generate internally a large proportion of the funds required for investment and although this proportion declined in 1979 and 1980, it is still averaging 66 percent in comparison with 43 percent for corporations generally. The electric power industry, in contrast, has used internal sources for only a small proportion of its investment funding, an average of only about 28 percent over the period 1970-78. This industry has traditionally financed a large part of its capital expenditures externally, using long-term debt as the source. The heavy external financing during the 1970s through the issue of bonds has left the utilities particularly vulnerable to increased interest rates as refinancing occurs and a shift to alternative sources of funds to finance new investments will not be easy to accomplish.

For the oil and gas companies, a number of new arrangements for raising funds that avoid high interest charges are becoming more important. Drilling funds have been used to raise funds for oil exploration and development, and their use will continue. It is unlikely, however, that they will draw in foreign funds as they did in the 1970s. Another approach that is being used increasingly to obtain funds from other sectors of the economy is through the links that are being arranged between petroleum and other firms, sometimes through take-overs or mergers but also through other arrangements. The important role of banks, however, will continue. For project financing, for example, which is expected to increase as mega projects are brought on stream, banks are major participants in making a whole set of arrangements for financing.

The National Energy Program (NEP), as outlined on October 28, 1980, contained proposals for extensive changes in almost every facet of Canadian energy policy. A number of analyses of the NEP have been carried out, and in almost all instances they have concluded that the effects on cash flow of existing oil and gas companies operating in western Canada would be such that reductions in investment in exploration and development would occur. The agreement between the federal government and Alberta in September 1981 modified the pricing and tax arrangements, with special significance for new oil. A number of moves are being taken by firms that will eventually lead to considerable re-structuring of the

industry. As to sources of funds, the NEP has made it very difficult to attract foreign equity funds and it has also made it difficult for foreign-owned firms operating in Canada to raise investment funds. Also, in the numerous take-overs that are occurring to Canadianize foreign-owned activities, whether the acquisition is by public or private corporation, there is a net outflow of saving.

Concurrently, prices of oil to consumers will rise quite rapidly, encouraging a considerable shift to natural gas and electricity. It may turn out that the growth in the use of electricity will be greater than projected, necessitating more investment than is now planned for the latter half of the 1980s. The utilities would face a considerable challenge in raising an even greater amount of capital than is currently anticipated.

In the general setting for energy financing considered in Chapter 5, it is assumed that the rate of inflation will abate during the 1980s and that interest rates will decline somewhat from their 1981 highs. What problems will be encountered in the financing of energy investments if rates of price increase are erratic and generally high and interest rates remain high and difficult to forecast? For one thing, those projects with long construction periods are likely to be delayed or abandoned. The effect of increased interest rates is even more significant for mega projects where the project must stand on its own in terms of financial feasibility. Already, the higher interest costs are one of the factors causing increased cost estimates for oil sands projects to the $10-12 billion range and of the total Alaska Natural Gas pipeline project to an estimated $30-40 billion.

This examination of the prospective sources of finance for energy investments leads one to the conclusion that the ingenuity of those responsible for raising the funds is going to be severely taxed. Adding to the already difficult task associated with the huge magnitude of the investments to be financed are the challenges to be met in adjusting to the changed energy policies and the uncertainties to be faced because of interest rate fluctuations. Some projects will have to be delayed or abandoned. This is not surprising. What is troubling, however, is that encouragement may be given to more costly rather than less costly sources of energy.

CHAPTER 2

ENERGY INVESTMENTS IN THE CONTEXT OF THE DEVELOPMENT OF THE CANADIAN ECONOMY

This chapter begins with a review of the period 1976-80, with focus on the actual value of energy investments in relation to what had been expected. Possible developments for the period to 1990 are then examined in the context of the prospective overall growth of the economy.

2.1 The Last Half of the 1970s

The Canadian economy entered the 1980s with a year of zero growth in GNP in 1980 (0.1 percent), following several years of slow growth (the 1976-80 average rate of growth was less than 3.0 percent). Earlier, a higher rate of economic growth had been projected, and it had been expected that heavy energy investments would push the level of investment over the 1976-80 period to more than 25 percent of the rapidly growing GNP. For example, in An Energy Strategy for Canada, with growth of the economy projected at 5.4 percent per annum, total investment was expected to average 25.2 percent of GNP, with peak rates of nearly 26 percent in 1979 and 1980; energy investment was expected to rise to 22 percent of the total by 1980.[1] In 1975, the Economic Council of Canada in its Twelfth Annual Review, had projected the potential growth of the economy to 1980 at 5.7 percent per annum and investment over the period rising from 23 to 27 percent of GNP.[2] In a study published by the Canadian Energy Research Institute in 1977,[3] Downs presented scenarios with rates of growth of 4.8 and 5.0 percent, and investment as a percentage of GNP at averages of 24.0 and 24.2 percent over the period 1976-80, rising in the following five-year period to between 25 and 26 percent.

Not only has the actual rate of growth over the period turned out to be much slower than projected, but the level of investment in relation to GNP has also been lower than projected, averaging 23.1 percent of GNP, which is below the 1956-75 long-term average of 23.5 percent. While energy

investments have been high, at 19.6 percent of total fixed capital formation compared to the 1956-75 average of 14.9 percent, the proportion has been lower than projected. Some of the major energy projects that were expected to be under way before 1980 have been delayed.

The composition of energy investment has also been somewhat different than projected. In Table 2.1 two projections provided in Financing Energy Self-Reliance are shown for the period 1976-80 along with what actually transpired. Spending on petroleum exploration and development, including oil sands and heavy oil development, has been as high as the maximum expected and has accounted for 34 percent of total energy investment. Moreover, the amount of investment was rising very rapidly in 1979 and 1980. Pipeline construction was much lower than even the lowest scenario, and capital outlays on natural gas and oil marketing and distribution were also lower than projected. This lack of investment reflects the many delays in proceeding with major gas pipeline projects. Investment in electric power, at 54 percent, was close to the proportion projected in scenario C in which the electricity share was highest. Much of this investment has resulted in the building up of excess capacity because the substitution of electricity for petroleum products has not been as extensive as envisaged. As a result, by the end of the 1976-80 period, increases in electricity investment had ceased.

2.2 Growth and Investment in the 1980s

Projections of the growth of the Canadian economy which are made now, are much lower than they were several years ago. One of the factors is the slower growth of the labour force in the 1980s than in the 1970s. In addition, however, after several years of little growth in productivity, projections for increases in productivity have been reduced. One influence at work here is the increased cost of energy and the prospective decline in energy use per unit of output in the economy. In Table 2.2, projections of average annual rates of growth in GNP for the periods 1980-85, 1981-85 and 1986-90 are shown. The projections in the first column are from the Department of Finance publication while those in the last two columns are from the specific sources cited. Most of these indicate an average annual growth rate

TABLE 2.1

ENERGY INVESTMENTS, 1976-80,
PROJECTIONS AND ACTUAL RESULTS, 5-YEAR TOTALS

	Energy, Mines & Resources, Canada				Actual	
	Scenario A		Scenario C			
	Billions of $1975	Per-cent	Billions of $1975	Per-cent	Billions of $1975	Per-cent
Petroleum Exploration and Development	10.6	23.1	8.3	19.7	13.7	33.7
Oil Sands and Heavy Oils	3.0	6.6	2.3	5.6		
Petroleum and Coal Products Manufacturing	1.4	3.1	1.4	3.4	1.3	3.2
Natural Gas and Oil Marketing and Distribution	2.5	5.5	2.5	5.9	1.6	3.9
Pipelines	5.7	12.5	2.4	5.8	1.4	3.4
Coal Mining	0.8	1.7	0.8	1.8	0.9	2.2
Electric Power	21.7	47.5	24.4	57.8	21.8	53.6
Total Energy	45.7	100.0	42.1	100.0	40.7[a]	100.0
Percent of Total Gross Fixed Capital Formation		20.5		n.a.		19.6
Total Investment as Percent of GNP[b]		25.2		n.a.		23.1

SOURCES: Financing Energy Self-Reliance, Department of Energy, Mines and Resources, Report EP 77-8, 1977, Private and Public Investment in Canada, Statistics Canada, 61-205, and Capital Expenditures in the Petroleum and Natural Gas and Allied Industries in Canada, released in the Statistics Canada daily, July 22, 1980.

[a]If uranium mining is included, the total is raised from $40.7 billion to $41.3 billion, and the percentage of total gross fixed capital formation to 19.9 percent.
[b]Total investment includes inventory accumulation.

TABLE 2.2

GNP PROJECTIONS
AVERAGE ANNUAL RATES OF GROWTH
(Percent)

	1980-85[a]	1981-85	1986-90
Finance	2.4	n.a.	n.a.
Economic Council	2.2	2.7[b]	2.6[b]
Informetrica	2.8	3.4[c]	3.6[c]
DRI	3.0	n.a.	n.a.
Royal Bank of Canada	n.a.	3.5[d]	4.3[d]

[a]The Medium Term Prospects for the Canadian Economy, 1980-1985, Department of Finance, Ottawa, October 1980.

[b]A Climate of Uncertainty, Seventeenth Annual Review, Economic Council of Canada, 1980, Base Case Projection.

[c]Informetrica, Reference Forecast, Post-Workshop 1-81, June 8, 1981.

[d]Econoscope, Royal Bank of Canada, March 1981.

of 3.5 percent or less for the decade. The Economic Council projection, at the low end of the scale, assumes very low rates of productivity increase. Informetrica's projection, on the other hand, contains higher rates of productivity increase, and thus could be taken as an indication of an economy in which substantial gains in efficiency are being achieved.

The capital investment projections embodied in the Economic Council's base case are summarized in Table 2.3. They indicate heavy investment requirements over the decade rising to over 24 percent of GNP during the first half of the decade and to nearly 26 percent for the last half. Total business investment, which includes that of government Crown corporations, would rise from about 19 to nearly 23 percent of GNP over the latter half of the decade, even after taking account of the decline in residential construction. Government investment is also projected to decline.

The projections are presented in terms of constant 1971 dollar expenditures.[4] The cost of construction-type investments has been increasing more rapidly than other components of Gross National Expenditure. Those making the projections assumed that this trend will continue. Thus, investment as a percentage of Gross National Expenditure (or GNP) will rise in current dollars somewhat more rapidly than is shown in Table 2.3. This matter is discussed in more detail in the section on energy investments, which are mostly of a construction-type.

The various categories of investment are components of final demand which, when being put in place, entail claims on the total resources of the economy--both real and financial. Once in place, however, the investments add to the productive capacity of the economy. For energy investments this is all too evident. In the past, relatively modest levels of investment were required to derive the forms of energy for use in productive activity and by consumers. In the years ahead, much more expensive investments are required to produce the various sources of Canada's energy.

2.3 Prospective Energy Investments

While it is clear that major energy investments are required, there is considerable divergence of view both on

TABLE 2.3

ECONOMIC COUNCIL OF CANADA INVESTMENT PROJECTIONS,
5-YEAR TOTALS

	1976-80		1981-85		1986-90	
	Billions of $1971	Per-cent	Billions of $1971	Per-cent	Billions of $1971	Per-cent
Residential Construction	29.3	4.7	26.2	3.8	27.6	3.5
Non-Residential Construction	41.0	6.5	57.3	8.2	76.7	9.6
Machinery and Equipment	50.8	8.1	64.1	9.2	77.0	9.6
Total Business Investment	121.0	19.3	147.7	21.2	181.4	22.7
Government Investment	19.0	3.0	18.9	2.7	19.9	2.5
Total Gross Fixed Capital Formation	140.0	22.4	166.5	23.9	201.2	25.2
Inventory Change	2.5	0.4	2.3	0.3	4.0	0.5
Total Investment	142.6	22.8	168.9	24.3	205.2	25.7
GNP	626.1	100.0	696.1	100.0	799.5	100.0

SOURCES: National Income and Expenditure Accounts, Statistics Canada 13-001, and A Climate of Uncertainty, Seventeenth Annual Review, Economic Council of Canada, 1980, and supporting documentation for the base case projection.

the size and on the likely timing of the investments. Furthermore, their level and timing will have major effects on the extent to which Canada's oil requirements are met from domestic sources and on how much of the other forms of energy Canada is able to export. As a starting point, the base case energy industry investment projections of the Economic Council will be presented. Other projections of the Council as well as those made by others will also be reviewed. The Council's projections presented here were completed prior to the October 28, 1980 announcement of the National Energy Program. In June 1981 the Council released a Spring, 1981 Reassessment containing projections of higher rates of price increase that will be considered in Chapter 5.

Total energy investments in the Council's base case, as shown in Table 2.4 in 1971 dollars, would amount to $100 billion over the period to 1990. In current dollars, as spent, the total would be almost $400 billion. Details of the current dollar projections are presented in Appendix A.

In the Council's projections the investments were assumed to be sufficient to bring a number of major projects into production, including an extension of Syncrude, two new oil sands projects, and the completion of the Alaska Highway and Quebec and Maritime Gas Pipelines. Requirements for oil imports would increase to more than double their 1980 level by 1987, after which time they would remain stable until the end of the decade. Increased gas exports were envisaged until the middle of the decade, after which they would decline. Electricity utility investments were assumed to slow from recent rates of increase, with no growth in 1981, followed by a 2.0 percent per annum rate of growth over the remainder of the period.

Comparison of Tables 2.4 and 2.1 indicates in general terms the marked shift in emphasis in the various categories of energy investment that follows from the general scenario outlined above. The proportion of the total that would be directed to the production of oil and gas would increase from 34 percent in the 1976-80 period to 47 percent over the first half of the 1980s, and to 56 percent in the last half of the decade.[5] The amount of investment, which includes oil sands plants and heavy oil upgrading plants along with exploration, development and production of oil and gas, amounts to

TABLE 2.4

ENERGY INVESTMENTS, ECONOMIC COUNCIL OF CANADA
BASE CASE, 5-YEAR TOTALS

	1981-85		1986-90	
	Billions of $1971	Per-Cent	Billions of $1971	Per-Cent
Crude Petroleum and Natural Gas[a]	21.3	47.5	31.2	56.2
Petroleum and Coal Products Manufacturing	0.9	2.0	1.6	2.8
Pipelines	4.8	10.7	3.0	5.4
Coal Mining	0.6	1.3	0.7	1.2
Electric Gas Utilities[b]	17.3	38.5	19.1	34.5
Total Energy[c]	44.8	100.0	55.5	100.1
Percent of Total Gross Fixed Capital Formation		26.9		27.6
Total Investment as Percent of GNP[d]		24.3		25.7

SOURCE: Material prepared for the Seventeenth Annual Review, Economic Council of Canada, 1980.

[a]The Canadian Petroleum Association, in its Cash Requirements Analysis, July 22, 1980, projected current dollar investment of $73 billion from 1981 to 1985 and $121 billion from 1986 to 1990, with cost increases of 11 percent at the beginning of the period, declining to 5.7 percent by 1990. Translating these projections into 1971 dollars yields estimates of $28 billion from 1981 to 1985 and $32 billion from 1986 to 1990.

[b]Data gathered from the utilities for by the Department of Energy, Mines and Resources, indicated 10-year totals of 37.5 billion in 1971 dollars (and 130.1 billion in current dollars).

[c]Informetrica Ltd. also forecasts total energy investment and its breakdown for its Spring and Fall workshops. The total projected in their June 1981 forecast was $4 billion in 1971 dollars, with most of the lower total accounted for by less in the crude petroleum and natural gas area. A forecast of capital expenditure in the energy sector is also contained in Energy and Industry, Barry Beale, Canadian Institute for Economic Policy, 1980. The estimate of total expenditures for the 11-year period, 1980-1990, is $269.5 billion in 1980 dollars. In 1971 dollars this amounts to $96.5 billion, somewhat lower than the 10-year total shown for the Economic Council's base case. He also provides a breakdown of the total which indicates less investment for electric utilities but otherwise a generally similar pattern to the Economic Council's base case projections.

[d]Total investment also includes inventory accumulation.

$52.5 billion over the decade in 1971 dollars. Measured in current dollars, the total would be $223 billion. (See Appendix Table A.1.) The Canadian Petroleum Association, in July 1980, projected current dollar investment of $194 billion for crude petroleum and natural gas investment over the same period. When one converts this total to 1971 dollars, using their somewhat different projections of cost changes, a total of $60 billion is obtained, which is about 15 percent above the Economic Council's projection. Informetrica's projection in their June, 1981 forecast, in contrast, is considerably below that of the Economic Council for this category of investment--$36 billion. Petroleum and Coal Products Manufacturing (see Table 2.4), in which oil refining is the main component, was not projected at as high a level of investment as in the latter half of the 1970s. Due to a number of prospective additional refining facilities which will make more effective use of the heavy residual oil, this projection may be on the low side.[6]

Pipeline investments had been expected to be high in the latter part of the 1970s, but they accounted for only 3.4 percent of total energy investments from 1976-80. A considerable increase is projected, to 10.7 percent of the total in 1981-85, dropping off to 5.4 percent in 1986-90. The total investment over the period to 1990 is projected at $8 billion in 1971 dollars, or $27 billion in 'as spent' dollars.

Investment in coal mining is associated with the development of thermal electric projects and the production of metallurgical coal for Canadian use as well as the expansion of coal mining based on export sales. The projections show no increase in the rate of investment as compared with 1976-80, and are probably too low, given the substantial new coal mining projects based on export sales recently announced. No projection is available for uranium mining. A number of new mines are being developed in northern Saskatchewan, based mainly on export sales.

The remaining component, investment in the expansion of electric power and natural gas utility facilities, is projected as increasing at a slow rate over the decade ahead, with the result that its proportion of total energy investment would drop from 54 percent during the 1976-80 period to 39 percent in 1981-85 and 35 percent in 1986-90. Investments

in gas distribution facilities (excluding pipelines) are included in the amounts projected for this category. The total of $36 billion in 1971 dollars ($133 billion in current dollars) for electric and gas utilities compares with a total for electric utilities over the 1981-90 period of $37.5 billion in data gathered by Energy, Mines and Resources Canada for their annual review of Electric Power in Canada. Informetrica's forecasts in the Spring of 1981 also contained projections for electricity investment at $37 billion.

The Economic Council of Canada also made projections for a scenario in which the oil sands projects and major gas pipelines do not proceed and in which the rate of growth in electric power investment declines 1.5 percent per year over the period ahead. The details of the resultant energy investments are provided in Table 2.5. The total energy investment in this scenario amounts to $82 billion (in 1971 dollars), or $329 billion in current dollars, nearly 20 percent less than in the base case. The overall effects on the economy of this reduction in investment are significant. They are summarized in the Council's Annual Review.

The billion or multi-billion dollar projects--mega projects[7]--have implications for investment financing that extend beyond their significant proportion of total energy investment. Even as individual projects, they are frequently too large to be supported by the cash flow of only one firm. Separate project entities are usually established with financing arrangements that draw on the resources of more than one firm and often also on the financing of a group rather than a single financial institution. In the early fall of 1981, a number of mega projects were in the final stages of planning. They include: the Alsands and Cold Lake plants, entailing recovery and upgrading of oil from the oil sands (with cost estimates in current dollars of each project in the range of $10-12 billion); the Canadian portion of the Alaska Natural Gas Pipeline project (with total cost estimates of the order of $30-40 billion, of which a substantial part would be spent in Canada); the Trans Quebec and Maritimes Pipeline ($1.2 billion); the oil pipeline from Norman Wells ($0.9 billion); the Arctic L.N.G. Pilot Project, involving a liquefaction plant and pipeline systems in the Arctic, the building of ice-reinforced L.N.G. tankers and a re-gasification plant in eastern Canada ($1.8 billion); and

TABLE 2.5

ENERGY INVESTMENTS, ECONOMIC COUNCIL OF CANADA PROJECTIONS EXCLUDING SELECTED LARGE ENERGY PROJECTS, 5-YEAR TOTALS

	1981-85		1986-90	
	Billions of $1971	Per-Cent	Billions of $1971	Per-Cent
Crude Petroleum and Natural Gas	17.4	47.9	27.7	59.9
Petroleum and Coal Products Manufacturing	0.8	2.2	1.6	3.5
Pipelines	1.7	4.6	1.5	3.3
Coal Mining	0.6	1.5	0.7	1.5
Electric and Gas Utilities	15.9	43.8	14.7	31.8
Total Energy Investments	36.3	100.0	46.2	100.0

SOURCE: Material prepared for the Seventeenth Annual Review, Economic Council of Canada, 1980.

the Montreal East oil upgrading plant that would draw residual oil from six existing refineries ($1.8 billion).

There are many other projects or investment programs under consideration. Cost estimates are in the public domain for some of them. Included in the list are: plants for upgrading heavy oil in the Lloydminster area of Saskatchewan and Alberta; additional oil sands plants; the exploration and development programs in the Beaufort Sea and adjacent areas (for which Dome Petroleum recently outlined a $40 billion scenario for the coming decade); the development of the Hibernia and other oil and gas fields off the Canadian east coast, with investment in Hibernia oil production alone estimated at $5 to $7 billion; the addition of electrical generation and transmission capacity in most provinces, including, for example, hydro projects in Quebec (where Hydro-Quebec has a $55 billion program for this decade), Newfoundland (where the cost estimate for the Lower Churchill Falls hydro project is $4.3 billion), and British Columbia (where a new project on the Peace River in the northeastern part of the province would cost $2.0 billion); and the costs of opening up and developing some of the northeast British Columbia coal for export ($2.9 billion).

The list could be extended. Even the above list, however, contains a total Canadian investment of at least $150 billion in current dollars, the basis used for most of the estimates. Earlier we noted that the total energy investment from 1981-90 has been projected at close to $400 billion in the Economic Council's base case. Some of the projects listed above were not included by the Council. There are projects that will be delayed or shelved. Each of these large investment projects in the energy field is subject to regulatory review by one or more government agencies and in most instances they are the subject of extended negotiations. The launching of such projects is, therefore, difficult. Nevertheless, it is clear that investment financing for the energy sector will have to provide for the requirements of many large single projects, with all of the special considerations that they entail.

In addition to investment by the corporations involved in the energy projects, in some instances there are substantial additional investments in townsites, schools,

roads and other transportation facilities which are borne by government agencies. These expenditures are not generally included in the totals shown for energy investment, although they would be included in the totals shown earlier in the chapter for government investment.

Footnotes

[1]Canada, Energy, Mines and Resources, Canada, An Energy Strategy for Canada: Policies for Self Reliance, (Ottawa: Minister of Supply and Services, Canada), April 1976, and the associated 1977 report on Financing Energy Self-Reliance.

[2]Canada, Economic Council of Canada, Twelfth Annual Review: Options for Growth, (Ottawa: Economic Council of Canada), 1975.

[3]J. R. Downs, The Availability of Capital to Fund the Development of Canadian Energy Supplies, (Calgary: Canadian Energy Research Institute), Study No. 1, November 1977.

[4]Total investment as a percentage of GNP thus differs from the 1975 dollar figure shown in Table 2.1. The effect of the dollars in which investments are measured is discussed in Appendix A.

[5]The totals in the two tables are not precisely comparable, since an additional item, oil marketing, is included in Table 2.1.

[6]The substantial new petrochemical investments now under way or in prospect in Alberta based on natural gas as a feedstock are not included here since they fall into the chemical and chemical products industry. They will have to be financed, however, and their likely total capital cost of $6 billion in Alberta alone through the 1980s (Financial Times, August 31, 1981) is far from insignificant.

[7]This definition of mega projects as those entailing investment of one billion or more dollars is arbitrary. In the Report of the Major Projects Task Force to the Federal Minister of Industry, Trade and Commerce and the Chairman, Federal/Provincial Ministers of Industry Conference, June, 1981, a major project was defined as "a specific investment which, either through the size of the initial capital investment or through some anticipated major effect, will have a significant impact on the Canadian economy, excluding real estate and property development projects." Their inventory of major capital projects in Canada to the year 2000 included those with a capital investment of $439 billion of which $351 billion was accounted for by energy investments.

CHAPTER 3

SOURCES OF FUNDS AND THE FINANCIAL INSTRUMENTS USED

With energy investments already accounting for 20 percent of total capital formation and expected to account for a considerably higher proportion during the decade ahead, the financing of Canadian energy resource development is best addressed in the context of the overall financing of investment in the economy. In this chapter the emphasis is on current or 'as spent' dollars, since arrangements for financing investments and the basic sources of information are in these terms.

3.1 Sources of Saving

Saving used for investment in an economy comes from four general sources: the personal, corporate, government and non-resident sectors. In Table 3.1 it is indicated how the proportions obtained from these sources have been changing relative to GNP and how they are projected to behave under the Economic Council's base case.

Personal saving, which excludes contributions to the Canada and Quebec Pension Plans (these are included in the government sector), has been increasing rapidly. The rate of saving is influenced by the extent of the rise in real incomes and by the age distribution of the population. Another important consideration has been the availability of private pension plans and registered retirement savings plans. One of the effects of these arrangements on private saving is that significant pools of funds for capital investment become administered by pension plan managers.

During the 1976-80 period the rate of personal saving as a percentage of personal disposable income was at record levels; the rate is projected by the Council as declining moderately over the coming years. Wood Gundy, in a forecast extending to 1983[1], also predicts a moderate decline in the personal saving rate from its 1979-80 highs. Projection of a decline in the personal saving rate from greater than 10

percent--where it has remained for several years--to 9.5 percent over the next few years and dropping to as low as 8.0 percent by the latter part of the 1980s, is conditional on inflation and interest rates declining. In a recent paper, Mackness of Pitfield Mackay Ross[2] expressed the view that 'inflation is firmly lodged in the 10 percent plus area'.

It is important to recognize, therefore, that the flow of personal saving is influenced by price changes and interest rates as well as by income and age distribution. The arrangements for public pensions will also influence decisions concerning the extent of private saving. In the Economic Council's projections, personal saving is projected as accounting for a somewhat lower proportion of total saving than it has in the recent past.

The corporate sector includes both private corporations and government business enterprises. Corporate saving consists of undistributed corporation profits, the unremitted profits of government business enterprises, an inventory valuation adjustment, and capital assistance from government. Rising profits for some types of business in the 1976-80 period--including those in the energy-supplying industries--resulted in retained earnings accounting for an increased proportion of the total investment funds required. Corporate savings provided more than 18 percent of the total funds required to finance investment. The projection assumes that this proportion will be maintained.

Another source of investment funds is capital consumption allowances, the depreciation of existing assets which is allowable for tax purposes. The total shown in Table 3.1 is for the whole economy. About half of the total is accounted for by the non-financial private corporations; these will be examined in more detail later in this chapter. Other sectors with substantial capital allowance provisions are the personal sector (29 percent) and government enterprises (20 percent). These capital consumption allowances represent funds set aside through depreciation of existing assets. In an inflationary period, depreciation allowances based on historical costs are not sufficient to cover the replacement costs of capital. Capital consumption allowances were the source of about 50 percent of the total funds required for investment in the economy from 1956 to 1970, but

TABLE 3.1

SOURCES OF GROSS SAVING IN CANADA
PERCENT OF CURRENT DOLLAR GNP

	1956 -60	1961 -65	1966 -70	1971 -75	1976 -80	1981 -85	1986 -90
Personal	2.9	3.1	3.8	5.5	6.8	6.0	5.2
Corporate[a]	4.0	3.9	3.8	3.4	4.3	4.7	4.9
Capital Consumption Allowances	12.1	12.2	11.5	10.9	10.8	11.7	12.5
Governments	1.7	2.0	3.7	2.5	-0.7	1.3	1.9
Non-Residents	3.7	1.6	0.7	1.3	1.9	2.2	2.5
Total[b]	24.8	23.0	23.6	23.6	23.2	25.8	27.0

SOURCES: National Accounts, Income and Expenditure, Statistics Canada 13-001, Table 8, and base case projection from the Background Document for the 17th Annual Review, Economic Council of Canada, 1980.

[a]Includes both private corporations and government business enterprises.

[b]Includes the residual error of estimate.

since then the proportion has dropped to about 46 percent and is expected to stay about the same over the coming decade.

Government saving includes contractual commitments under the Canada and Quebec Pension Plans, including receipts from both employers and employees. Until the 1976-80 period, governments were a substantial source of saving and are again expected to become so in the 1980s as they restrain their level of expenditures and as the federal government moves closer to balancing its budget. There is also the prospect of increased contribution rates for government pension plans.

Relevant for financing is the fact that pools of funds now exist from the Canada and Quebec Pension Plans--the latter handled by the Caisse de Depot et de Placement with projected assets of $12 billion under its management by the end of 1981. The channeling of 30 percent of Alberta's non-renewable resource revenue into the Alberta Heritage Savings Trust Fund has also created a major pool of investment capital, with the assets of the fund having reached nearly $9 billion by March 31, 1981.

During Canada's resource boom of the 1950s, 15 percent of Canadian gross saving was derived from non-residents. After that, the proportion dropped, to 7 percent in the first half of the 1960s and 3 percent during the latter half of that decade. During the 1970s the proportion was again rising from 6 percent over the first half of the decade to 8 percent from 1976-80. The proportion is projected to be 9 percent over the 1980s.[3]

There are differing views on the extent to which Canada will be dependent on foreign sources of funds for its investments in future years. The Economic Council's projection, on which Table 3.1 is based, indicates that the ratio of non-resident saving to the total required to finance investment, will be about 9 percent in each of the two five-year periods. Downs, in a 1977 study published by the Canadian Energy Research Institute,[4] projected a ratio of about 7.5 percent for the period 1981-90, which is what it averaged over 25 years between 1956-80. Waddingham, of the Royal Bank of Canada, in the Fall of 1980,[5] looking ahead for the next 20 years to 2000, projected that cumulative offshore borrowing could reach $350 billion in financing $1.4 trillion of

energy investment, a ratio of 25 percent. While Waddingham's's focus is on the energy sector, it does convey an impression of a heavy dependence of the total Canadian economy on foreign sources of funds for its investments. He also takes the position that non-residential investment spending will be the main area of economic strength in Canada for the coming decade and beyond. In contrast, Grant, of Wood Gundy,[6] has been expressing the view that Canada's net reliance on foreign sources of capital would be relatively low in the 1980s. His view emerges from assumptions of economic growth at an average rate of 3 percent, with total investment as low as 20 percent of GNP as housing construction and government expenditures slow down as compared with the 1970s.

It is relevant to observe that around the world the oil and gas industry will be making large energy investments. The Chairman of Chase Manhattan Bank of New York recently estimated that during the 1980s this industry would be investing $2 trillion in current dollars, assuming an 8 percent inflation rate. The industry will need to raise about $750 billion from credit markets.[7]

3.2 Financing Investment

Of the total fixed capital investment in the Canadian economy in 1979, 47 percent was carried out by non-financial private corporations, 15 percent by non-financial government enterprises, 24 percent by persons and unincorporated business (which is where much of the housing investment appears), and 11 percent by provincial and local governments and hospitals, with the remaining 3 percent spread among other entities, including federal government departments and financial institutions. The attention here is focused on the non-financial private corporations, which make most of the energy resource development investment. To gain some impression of how they are likely to finance their investment activities in the future, it is worth reviewing how they have adjusted their financing as conditions have altered in the economy over the past 15 years. In Figure 3.1, the changes in total investment and in the acquisition of financial assets by the non-financial private corporations are shown.[8] Part of the financing for the acquisition of these real and financial assets comes from undistributed profits and capital

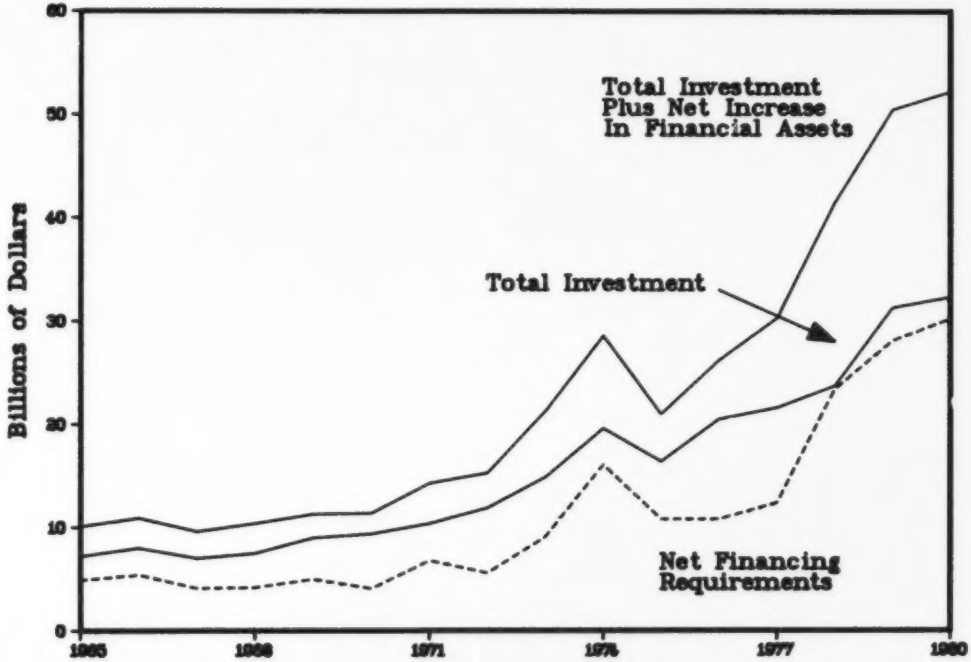

FIGURE 3.1: Non-Financial Private Corporations: Investment in Financial and Non-Financial Assets and Financing Requirements

SOURCE: Appendix Table B.1

consumption allowances. After taking these internal sources of funds into account, there remains a net financing requirement which is also shown in Figure 3.1. This external financing requirement amounted to about 40-50 percent of the total investment in financial and non-financial assets in most years but rose to more than 55 percent in 1974 and again in the years 1978-80, in both instances after several years of rapid investment increases.

The extent to which various sources of external financing were used was influenced also by whether or not a build-up in financing requirements had been taking place, as can be seen from Figure 3.2. It shows changes in the distribution of the sources used to meet the net financing requirement over the years since 1965. During the latter part of the 1960s the Canadian economy exhibited a period of steady growth with investment maintained at a fairly high level but not increasing rapidly. Fixed interest sources accounted for about one-third of the corporations' financing without any great difficulty being encountered; bonds averaged 18 percent of the total and mortgages 14 percent. A further 18 percent was accounted for by issues of share capital bringing the total for long-term capital to just over 50 percent. By 1970, a year of slow growth in the economy, these long-term sources of funds accounted for two-thirds of the total; bonds alone accounted for a full third.

Then, in the period 1971-73, as the economy grew rapidly at an average rate of 6.8 percent in real terms and with investment also growing rapidly, corporations turned heavily to other sources of funds. Loans increased from 7 percent of the total in 1970 to 37 percent in 1973. The setting of monetary policy through this period accommodated an expansion of bank lending and the banks were able to gain and maintain a major share in the provision of investment capital.

In 1974 the growth of the economy slowed while the acquisition of assets continued to increase. Price increases accelerated to well over 10 percent and interest rates rose sharply. Long-term financing was difficult to arrange; loans were increased but much less rapidly than in the preceding years; and corporations had to reach for other sources of finance, resorting increasingly to payables, or trade credits, other forms of short-term credit, and other sources of

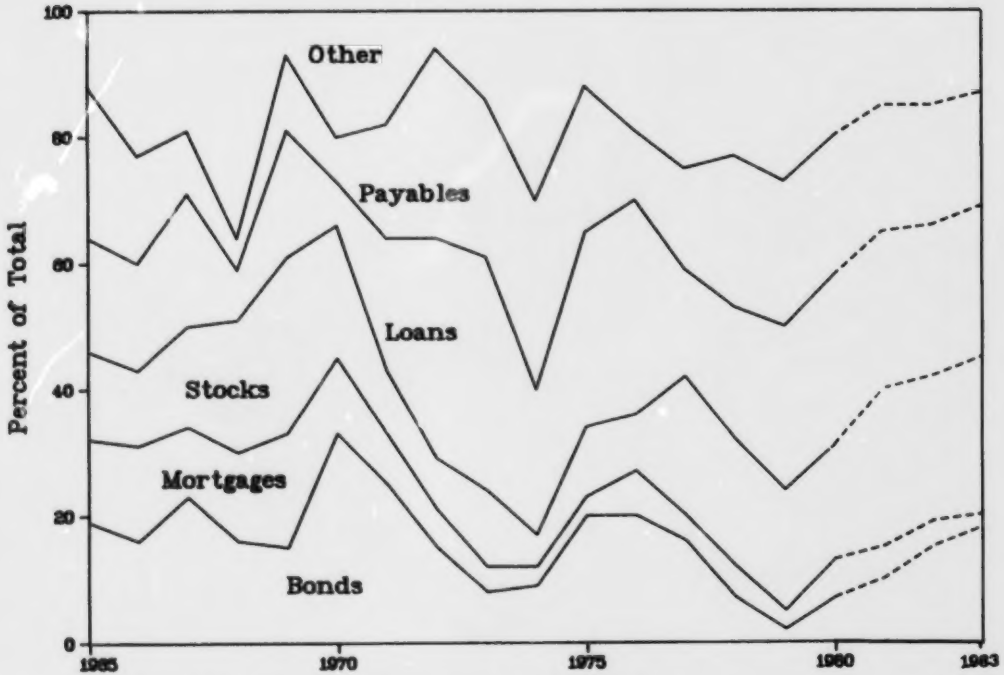

FIGURE 3.2: Sources of External Financing : Non–Financial Private Corporations

SOURCE: Appendix Table B.1 and Canadian Economy Forecast 1980 through 1983, Wood–Gundy Limited, Toronto, November, 1980.

finance, including the drawing of funds from associated enterprises.

In 1975, with the economy in recession, a sharp drop in asset acquisition occurred. Price increases, although high, did not accelerate further, and interest rates stabilized. Long-term debt began to regain a more significant role. In 1976 and 1977, with resumption of growth in the economy, overall financing requirements increased. Most of the increase was met from internal sources. With price increases having dropped to 7.5-8.0 percent and interest rates reasonably stable, the proportion accounted for by long-term financing remained high, reaching more than 40 percent in 1977, with both bonds and shares accounting for significant proportions.[9]

In 1978 and 1979, while the growth of the economy continued at modest rates, the rate of increase in investment accelerated and the external financing requirements of corporations rose rapidly. Prices rose by 9 percent in each year and interest rates moved up. Long-term fixed interest financing (bonds and mortgages) dropped to where it accounted for only 5 percent of the total external net financing requirement in 1979. Stocks retained their share of about 20 percent. Loans expanded their share to 26 percent, and other short-term forms of financing also increased in relative importance.

In 1980, with the economy in recession and little increase in investment in real and financial assets (a decline in investment in constant dollar terms), financing requirements grew slowly. Prices rose by 10 percent and interest rates increased. The share of bond and mortgage financing rose from the bottom hit in 1979, replacing some of the forms of short-term credit other than loans and payables. These latter two categories made up about 50 percent of the total in 1979 and 1980.

Looking ahead, what are the requirements for external financing likely to be, and what sources will the corporate sector turn to for their investment funding?

Rapid growth of non-residential business investment, as envisaged in Tables 2.3 and 2.4 in the preceding chapter, along with moderate growth of the economy, would entail an

increase in the flow of total saving relative to GNP, as shown in Table 3.1. While it is difficult to forecast the timing in the surges of investment that are likely to occur, it is apparent from the recent history that corporations will have to seek higher proportions of external funds when investment in real and financial assets has been rising rapidly for a sustained period. Corporations would have used the accumulation of undistributed profits and capital consumption allowances in the early stages of increased investment.

As to the distribution of the sources of financing that might be drawn on outside of the corporation, the November 1980 projection of Wood Gundy[10] is shown in Figure 3.2, covering the period 1981-83. It reflects the assumption of recovery from recession with investment growing somewhat more rapidly than GNP. Price increases were projected as declining to 8 percent by 1983. Under these assumptions, some recovery of the role of bonds was projected, with the total of bonds and mortgages rising to account for 20 percent in 1983. Stocks would account for a further 25 percent, and they were expected to account for that proportion in each of the three years. The shift to stock issues has been anticipated for some time. There is reference at the end of the paper by Mackness, referred to earlier in this chapter, to 'the need for an enlarged equity base as a matter of financial prudence'. He also treats the destabilization and erosion of the long-term bond market caused by the sustained, high rates of inflation. Also supporting the increased role for stocks envisaged by these financial market analysts are a wave of new stock issues in 1981.[11] Still, long-term financing at 40-45 percent is far below the 50-65 percent that was the norm in the latter half of the 1960s.

With respect to bonds and preferred shares, the nature of the instruments is also changing because of difficulties in raising money for long terms with fixed interest rates, given the uncertainty concerning future interest rates. Preferred shares and debentures that are convertible into common shares at a specified price for a fixed number of years are becoming commonplace. Long-term loans are also being arranged on a variable rate basis. For example, Turbo Resources raised $25 million and Canadian Utilities raised $30 million on floating rate notes in the spring of 1981.

There are also changes taking place in the institutions that provide the sources of financing. The role of banks has increased markedly in the past decade; also they are particularly important in major project financing. For example, a $1.05 billion loan package for the Northern Border Pipeline Co., building part of the Alaska Natural Gas Pipeline project, was arranged by the Canadian Imperial Bank of Commerce involving 28 Canadian and U.S. banks. As mentioned earlier, pension funds, as well as the Quebec Caisse de Depot et de Placement, and the Alberta Heritage Savings Trust Fund now have large amounts of money to invest. In 1980 pension funds were allocating proportionately more to equities. Changes in the investment patterns of these major sources of investment capital will be significant in overall financing in the years ahead. Another development could be the resurgence of life insurance companies.

There are also special arrangements to finance certain types of investment, as, for example, the drilling funds in the oil and gas industry. These are best examined, however, in the context of an examination of the financing of energy investment, which is the subject of the next chapter.

Footnotes

[1]Canadian Economy Forecast, 1980 through 1983, Wood Gundy Limited, Toronto, November 1980.

[2]William Mackness, Inflation in North America, a paper presented to the Senior Executive Seminar, The Conference Board in Canada, Calgary, Alberta, October 30-31, 1980.

[3]Canada has had a long-standing deficit in its current account transactions with non-residents. A net import of resources from abroad has been required to offset this deficit. This non-resident saving has its counterpart on the financial side in net borrowings by Canadians from abroad.

[4]J. R. Downs, The Availability of Capital to Fund the Development of Canadian Energy Supplies, (Calgary: Canadian Energy Research Institute), Study No. 1, November 1977.

[5]Daryll G. Waddingham, The Royal Bank of Canada, Financing Canadian Energy Projects, a paper presented before the Society of Petroleum Engineers of AIME, September 21-24, 1980, Dallas, Texas. See also Daryll G. Waddingham, The Canadian Balance of Payments to the Year 2000, November 1979.

[6]John Grant, Director and Chief Economist, Wood Gundy Limited, The Growth of Canada's Capital Markets in the Coming Decade, Financial Times of Canada Outlook Conference, Toronto, September 5, 1979.

[7]See the report in the Globe and Mail, September 1, 1981 concerning the address of W. C. Butcher, Chairman of Chase Manhattan Bank of New York to the Calgary Chamber of Commerce.

[8]The basic material from which Figures 3.1 and 3.2 were derived is contained in Appendix Table B.1.

[9]In 1972 the government granted a deduction for interest expense on money which was used to buy shares of other Canadian companies, even though the dividend income thereon would be tax free to a corporate investor. This stimulated the use of income debentures and term-preferred shares, particularly during the years just after the middle of the decade. For further information see Income Debentures and Term Preferred Shares, F. J. Harman and J. A. Johnson, Canadian Tax Journal, November-December, 1978. In the

November 16, 1978 Federal Budget a revision in the Income Tax Act was announced that changed the treatment of these securities so that their use as debt obligations instead of as equities would be recognized.

[10] Canadian Economy Forecast, 1980 through 1983, Wood Gundy Limited, Toronto, November 1980. In their June 1981 forecast, the rate of price increase drops only to 9 percent in 1983 and the proportion of financing that is long-term increases to 38 percent instead of 45 percent.

[11] See, for example, "Stocks Flood the Market", Financial Times of Canada, April 27, 1981, page. 3.

CHAPTER 4

FINANCING ENERGY INVESTMENTS—THE RECENT PAST

The recent history of energy investments has been reviewed and prospective energy investments have been considered. Trends in financing of overall corporate activity in the Canadian economy have also been outlined. Attention is turned now to the financing of energy investments, reviewing in this chapter the past decade and looking ahead in the next chapter to changes that may lie ahead. Some of the general tendencies that affect financing of overall economic activity also influence energy sector activities. There are, however, a number of special features pertaining to investments in Canadian energy supply and distribution. They include:

- the location of investment, a great deal of which takes place in isolated and frontier areas;
- the lumpiness of much of the investment, with a significant proportion being in mega projects;
- the generally long lead times between the beginning of investment and production; and
- the increasing role of governments, both as participants and as regulators concerned with pricing, revenue distribution, environmental and social considerations.

There are several major components of Canadian energy supply, each of which has particular characteristics that affect financing. The oil and gas industry is composed of several types of companies, including integrated corporations whose operations cover both upstream (exploration and development) and downstream (refining and distribution) activities, as well as companies engaged mainly in the upstream operations, with these latter firms ranging widely in size. In addition, there are the pipeline companies and the firms providing drilling and other services.

The production and distribution of electric power is organized quite differently. In most provinces the activities are carried out by provincial Crown corporations, although in some instances private firms operate as regulated utilities. The sources of power for electrical generation vary in different parts of the country, with hydro being the dominant source in Quebec, Manitoba and British Columbia, coal in Saskatchewan and Alberta, oil in the Atlantic Provinces, and hydro, nuclear and coal in Ontario.

The coal and uranium to supply the fuel for thermal electric generation is mined in Canada, except for coal imported by Ontario Hydro from the eastern United States. In addition, the coal and uranium mining industries have been expanding their activities mainly with export markets in view, including exports of metallurgical as well as thermal coal.

Changes in energy supply have been taking place, some of which are already in train, including the substitution of other sources (including coal, nuclear energy and hydro) for oil in electric power generation in the Atlantic Provinces, and the move to substitute natural gas for oil in central and eastern Canada and Vancouver Island. Steps have also been taken to reduce energy consumption in all of its various uses. While the conservation measures implemented and contemplated are significant, they lie outside of the purview of this study except for their impact on the scale of investment requirements to supply energy.

There are additional sources of energy supply that will become more important, particularly in the longer time span of 20-30 years. Solar, wind, biomass and other renewable energy forms will gradually become more competitive with the non-renewable energy sources. During the decade ahead, however, much of the activity related to renewable sources will be centred on research and development. No attempt is made here to examine the financing of this activity, nor the beginnings of the manufacturing and service activities that are already evident. Governments are supporting research and development and venture capital firms exist to provide capital for new activities.[1] It has been argued that more government support is needed if substantial

Canadian manufacturing capability is to be developed in the solar energy field.

4.1 The Petroleum Industry

In 1980, petroleum industry investments totalled $7.6 billion. Included here are exploration and development for oil and gas in Western Canada, the Arctic, and off the east coast, oil sands development ($6.2 billion), refining investments ($0.3 billion), pipeline construction ($0.6 billion), natural gas distribution ($0.4 billion), and oil marketing ($0.2 billion). In Figure 4.1, the build-up of the total investment in the 1970s is shown in current dollars, reflecting expenditure increases, and this camouflages some of the changes in real activity because of changing rates of price increase. After a period of relatively slow growth in expenditure at the beginning of the decade, investment started to increase more rapidly in 1975 (the 1974 increase is entirely due to a surge in construction costs), slowed in 1977 and 1978, and then rose very rapidly in 1979 and 1980. Also shown in Figure 4.1 are capital expenditures of selected large companies as reported in the Canadian Petroleum Industry Monitoring Survey over the period to 1980.[2]

These changes in investment of the petroleum industry over the past decade show a considerably different pattern than do changes in overall investment of non-financial corporations in the Canadian economy, indicating the effect of government energy policy developments. The surge of investment that occurred generally in the economy in 1973 and 1974 was delayed in the petroleum sector. Expenditures in the petroleum industry rose rapidly in 1975 when investment activity elsewhere in the economy dropped sharply. Also, in contrast to general corporate investment, petroleum industry investment continued to increase rapidly in 1980 when overall investment increased only moderately. (Compare Figures 3.1 and 4.1).

In comparison with corporations in other sectors, firms in the petroleum industry have been able to generate internally a larger proportion of the funds required for investment, although the proportion from external sources has been increasing (see bottom portion of Figure 4.1). For corporations on the whole, the proportion generated internally

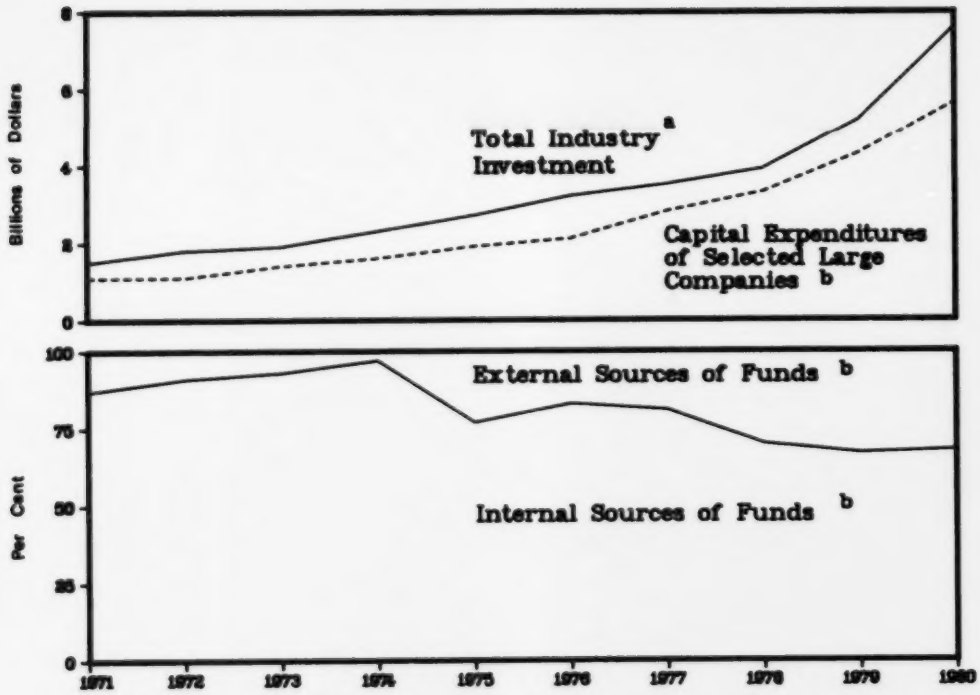

FIGURE 4.1: Petroleum Industry Investment and Financing

SOURCE: [a] Statistics Canada, Public and Private Investment in Canada (includes total of oil and gas, pipeline, petroleum and coal products manufacturing, natural gas distribution and oil marketing)

[b] Appendix Table C.1

averaged 43 percent in 1979 and 1980. In the petroleum industry, the proportion for the selected large companies averaged 68 percent, and for all 100 firms included in the survey combined, about 66 percent.[3] One of the factors occasioning this high proportion has been the fiscal incentives that have been important in encouraging petroleum industry investments.[4] For example, in each of the years 1978 to 1980, the Petroleum Monitoring Survey indicates that 15 percent of cash flow was generated by the expensing provisions for exploration and development and about 7 percent was generated by depletion allowances. Nevertheless, during 1980 new long-term debt and equity were growing more rapidly than internal cash flow. Had it not been for the fact that proceeds from extraordinary sales of assets declined sharply in 1980, the proportion raised externally would have increased.

As the external financing requirements increased in the face of sustained and increasing rates of growth in capital expenditures, existing sources such as long-term debt and equity were extended as were other external sources of funds. (See Appendix Table C.1, which contains data for the period 1971-80.) As to where the other long-term funds were obtained, it is apparent from the Industrial Corporations Financial Statistics[5] that chartered banks have been increasing their long-term loans to the petroleum industry.

In addition to these traditional sources, there are a number of new developments that are not fully reflected in statistical data such as that of the Petroleum Monitoring Survey or the Industrial Corporations Financial Statistics. Some of the projects for which separate corporate entities are established may be passed over in their early stages. Also, certain new financing arrangements, such as drilling funds, may be inadequately reflected in data gathered up to now. Drilling funds, being partnerships rather than corporate entities, fall into the non-corporate and personal sector. They have been important sources of funds, channelling investment funds from individuals, both in Canada and abroad, to petroleum companies to help to pay for exploration and development expenditures. This is being done on a fee basis or in return for an eventual share of the profits deriving from the investments. Fiscal incentives to encourage petroleum industry investments have been extended to

individuals through these arrangements. While the total amount of funds obtained from this source is not available, it is known to have been substantial during the last few years.

4.2 The Electric Power Industry

Investment in the generation and distribution of electric power amounted to $6.4 billion in each of the past two years. Figure 4.2 shows the path of investments over the past decade. In contrast to the petroleum industry, where the increase in investment was slow in 1973 and 1974, electric power industry investment grew rapidly in those years and accelerated in 1975. Subsequently, electricity investment increases moderated, especially in 1979 and 1980 when projections of growth in demand for electricity were being reduced.[6]

In association with the public utility character of the electric power industry, internal sources of funds have been used only for a relatively small proportion of the financing of capital investment, averaging about 28 percent over the period 1970-78. (See the lower panel of Figure 4.2, which is based on information gathered by Energy, Mines and Resources Canada. Additional detail is provided in Appendix Table C.2.) The industry has traditionally financed a large part of its capital expenditures externally, using long-term debt as the source. In fact, the electric utilities raised more than $20 billion in long-term debt (mostly bonds) over the period 1970-78; this accounted for nearly two-thirds of the total bond financing of the whole non-financial corporate and public enterprise sectors during those years. Information available for 1979 from Statistics Canada on the electric utilities indicated continuing reliance on bond financing in 1979,[7] and the extent and size of public offerings announced in 1980 and 1981 suggested little change. In 1981, however, because of difficulties in marketing long term bonds, utilities have had to shorten the terms. For example, the $250 million U.S. issue of Hydro Quebec announced in September 1981 had a term of only 10 years.

The extent of internal versus external financing is closely related to the pricing of electricity. If electricity prices had been increased along with the increasing oil

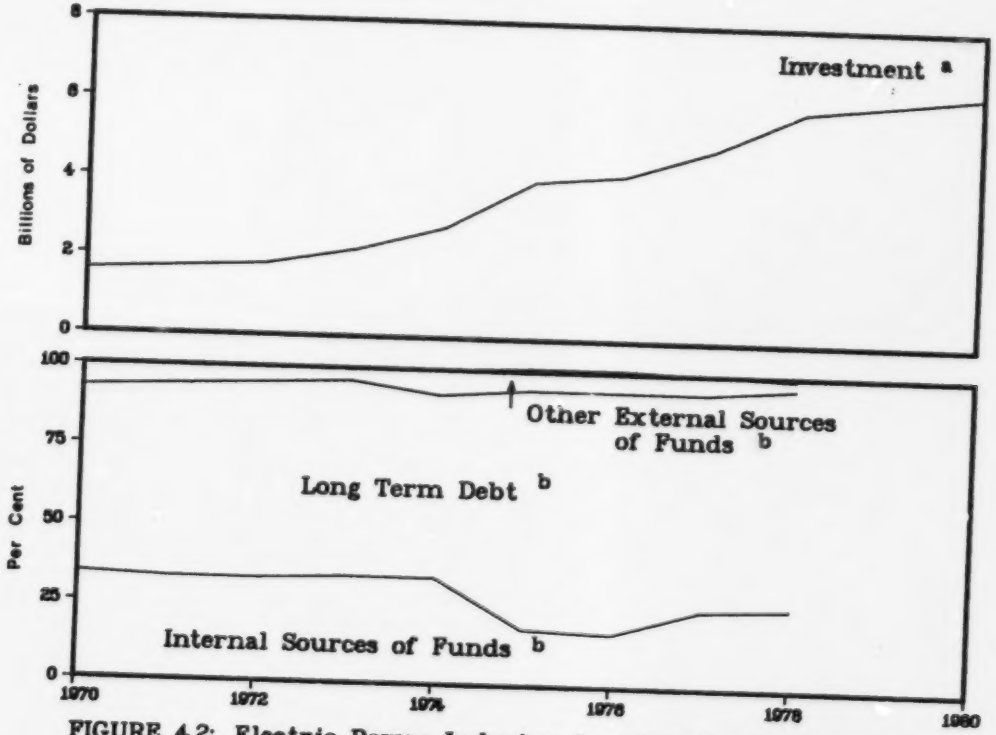

FIGURE 4.2: Electric Power Industry Investment and Financing

SOURCE: [a] Statistics Canada, Public and Private Investment in Canada
[b] Appendix Table C.2

and gas prices, or if they had been even close to these increases, more of the funds for investment could have been generated internally.[8] The heavy external financing done during the 1970s through the issue of bonds has left the utilities particularly vulnerable to increased interest rates as refinancing occurs.[9] A shift to alternative sources of funds to finance new investments is not easy to accomplish, however, without altering both regulatory procedures and the financial structure of the utilities.

Footnotes

[1]In the National Energy Program, announced on October 28, 1980, provision was made for a new Canadian alternative energy corporation, to be called Enertech Canada, subsequently changed to Canertech, with initial funding of $20 million provided. In May 1981, in the report of the Special Parliamentary Committee on Alternative Energy and Oil Substitution, one of the recommendations was for federal government support for the development of technology and infrastructure for hydrogen production, distribution and use, relying on an initial five-year fund of $1 billion.

[2]Several differences exist between the two series charted in the top part of Figure 4.1. The total industry investment is for a somewhat different aggregation than that for the capital expenditures of the selected large companies, with the latter excluding pipeline companies and natural gas distribution. Also, the concept of capital expenditures is different from investment, including land and leases in addition to investment expenditures. Foreign activities are also included in the Petroleum Monitoring Survey reports.

[3]Calculations made using the 1980 Canadian Petroleum Industry Monitoring Survey, Petroleum Monitoring Agency (see Appendix Table C.1). A number of changes had to be made to obtain reasonable comparability with the overall corporate data. In the Petroleum Monitoring Survey itself, the average proportion for the 100 firms shown as generated internally for the two years was 60 percent. In their calculations they use gross sources of funds whereas in the other calculations shown in the text increases in equity and debt are on a net basis.

[4]For a description of the fiscal incentives that were in existence up to 1980, see W. G. Friedenberg, Z. Charles Slagorsky, and A. J. Walsh "Government Incentives in Canada's Petroleum Industry," (Calgary: Canadian Energy Research Institute), Working Paper 80-1, March 1980.

[5]Canada, Statistics Canada, Industrial Corporations Financial Statistics, Catalogue 61-003, which provides data for the Mineral Fuels Industry and the Petroleum and Coal Products Manufacturing Industry.

[6]For example, Ontario Hydro's 20-year forecast for the growth of electricity demand was dropped to 3.4 percent per annum in January 1980, and to 3.1 percent in January 1981. See the Globe and Mail, January 19, 1981.

[7]Canada, Statistics Canada, Electric Power Statistics: Volume II, Annual Statistics, Catalogue 57-202.

[8]This subject is discussed in J.R. Downs, The Availability of Capital to Fund the Development of Canadian Energy Supplies, (Calgary: Canadian Energy Research Institute), Study No. 1, November 1977.

[9]See, for example, the February 29, 1981 report on the swing from profits to losses at Manitoba Hydro for the first nine months of its current fiscal year. (Manitoba Hydro is operating under a 5-year freeze in electricity rates.)

CHAPTER 5

FINANCING FUTURE ENERGY INVESTMENTS

All energy investments have been treated in a group throughout this study because the developments in each energy sector now have a significant influence on other energy sectors. For example, the pricing of electricity has a bearing on the extent to which it is substituted for oil and gas. In this chapter, the implications of the matters considered in the preceding three chapters for the financing of future energy investments are addressed. No attempt is made to provide a quantitative forecast of the prospective sources of energy financing, however, a number of issues relevant to energy investment financing are discussed. Following the presentation of this general view, special attention is paid to the measures announced in the October 1980 National Energy Program and the September 1981 agreements between the federal and the Alberta and the British Columbia governments. Finally, the implications for the financing of energy investments of continued high interest rates and high but uncertain rates of price increase are considered.

5.1 The General Setting for Energy Financing

In Chapter 2, the Economic Council's base case projection was presented, with energy investments of $100 billion in 1971 dollars (nearly $400 billion in current dollars) from 1981 through 1990 in an economy growing at less than 3 percent per annum. In that scenario total investment rises to nearly 26 percent of GNP in the 1986-90 period and energy investment accounts for between 27 and 28 percent of total gross fixed capital formation. All sources of saving in the economy are increased to accommodate this high level of investment, although personal saving which was at record levels in the 1970s, particularly in the latter half of the decade, increases less rapidly than other sources.[1] Net reliance on foreign capital remains at about the same proportion of total saving as it was over the 1976-80 period, in the range of 8-9 percent.

With very strong growth of investment over the coming decade, it can be expected that firms will have to increase the proportion of financing that is derived from sources external to them. For corporations in general this occurred in periods of strong investment growth during the past decade and has occurred also in the petroleum industry in recent years, with the rapid increases in investment that took place in 1979 and 1980. Another factor that will have a strong influence on the extent of dependence on external funds is energy policy. In the Economic Council's projection the wellhead price of crude oil was assumed to rise $4 per barrel per year from 1981 onward, and revenue splits between the federal and provincial governments and producers, and the federal oil import subsidy program, were assumed to continue as they were prior to the October 28, 1980 National Energy Program.

With the relatively slow growth of the economy, along with an assumed weak 1981-82 recovery in the United States and other OECD countries, price increases moderate somewhat, dropping below 9 percent by the mid-1980s and to 8 percent or less by the latter part of the decade. The unemployment rate drops slowly, to 6.5 percent by 1985 and to slightly below 6.0 percent from 1988 to 1990. Under these conditions interest rates on long-term financing such as bonds drop from the very high rates reached in 1980 and 1981.

Some easing, along with increased stability of interest rates for longer-term financing, could result in a resurgence from the lows of 1979, 1980 and 1981 in the use of bonds. (See Figure 3.2.) This would be of major significance to firms in the energy sector. Electric utilities have relied heavily on this type of financing and continue to have high borrowing requirements. For example, Ontario Hydro in January 1981 announced that it planned to borrow $2.3 billion in 1981, an increase of $0.5 billion from 1980. Substantial borrowing in the United States was envisaged. In August 1981 Ontario Hydro announced a $150 million U.S. dollar issue. At about the same time, Hydro Quebec announced a $250 million U.S. dollar issue. Major pipeline companies also rely heavily on long-term financing as do other major projects such as oil sands plants. The financial feasibility of some of these mega projects could be in jeopardy unless long-term

interest rates decline significantly from late summer 1981 peaks.

In the last year or two, and especially during the first part of 1981 with the very high interest rates, energy firms turned heavily to the issue of shares to raise funds for investment. This trend could continue for some time if there is sufficient strength in stock markets. Investors have become uneasy about long-term fixed rate investments, and companies have found floating rate debt to be very expensive. Among the investors giving increased attention to stocks are those responsible for the investment of pension and other major funds. The share financing during 1981 included that by Dome Canada (more than $400 million in common shares), Brascan ($100 million in preferred shares), TransCanada Pipelines ($75 million in preferred shares), Union Gas ($50 million in common shares), and a considerable number of smaller issues. TransAlta Utilities announced an offering of common share rights.

A number of other arrangements for raising funds that avoid high interest charges are also becoming more important. Drilling funds have been used to raise funds for oil exploration and development, and their use will continue. Ingles of Westfield Securities expressed the view that drilling funds would become the most favoured method of financing new exploration plays provided that the funds are structured so as to be eligible for federal incentive payments, although others are less optimistic about their scope.[2] It is unlikely, however, that they will draw in foreign funds as they did in the 1970s when an estimated $400 million was channelled to Canadian oil companies from German investors through drilling funds between 1973 and 1979.[3] In some instances the funds are organized quite independently of the oil companies to which they channel funds. In other instances they are much more closely linked, a situation which is likely to become the general procedure given the complex regulations being established under the National Energy Program. Funds being raised in 1981 include a $10 million 1981 program of Brinco, with Brinco Oil and Gas as operator, and an $8 million program of Shelter, with Shelter Hydrocarbons as operator.

In addition to the drilling funds, another approach that is being used increasingly to obtain funds from other

sectors of the economy is through the links that are being arranged between petroleum and other firms. Recent extensions into the energy sector have been those of Brinco, which was re-organized in 1980 and is planning additional energy sector investments, and the British Columbia Resources Investment Corporation, which acquired ownership of Kaiser Resources in 1980. Companies in other resource industries, such as Consolidated Bathurst, in the pulp and paper industry, and Inco, in the mining industry, are acquiring interests in the oil industry. More recently, in March 1981, Bralorne Resources signed a $117 million joint venture agreement with C.I.L., Versatile Corporation, and I.C.I. Petroleum, an affiliate of Imperial Chemical Industries. The funds will be used for oil and gas exploration in Alberta.

To the extent that these various types of longer-term financing can be extended, energy companies will be able to reduce their present heavy dependence on bank and other loans and other types of credit when they are exposed to upward movements of interest rates. In certain circumstances companies will move to replace loans with other types of liabilities such as the February 1981 $65 million financing by Bow Valley Resources Services in units containing long-term convertible debentures and common shares. With the generally rising capital requirements of the energy corporations, however, the need for loans from banks and other financial institutions will rise. This will be the case when acquisitions are being arranged, as for example in the case of Dome Petroleum's arrangement of a 10-year term loan for between $1.1 and $1.7 billion from four Canadian chartered banks in its May 1981 bid for control of Hudson's Bay Oil and Gas.

Bank loans will also be critical in arranging project financing in the case of the mega projects where the banks will be major participants in making a whole set of arrangements for financing. With project financing, each project has specifically designed financing, with future cash flow being used as collateral. The most important reason for the development of project financing is that it limits the recourse to the sponsor, thus leaving his borrowing capacity to be used for other investments. Another reason is that it may be necessary to have a stand-alone project to comply with public utility regulation including cost-of-service pricing. Usually, banks reduce their vulnerability by spreading the

financing among a number of banks. While project financing has not been common in the energy sector to date in Canada, its use is expected to grow considerably.[4] In addition to the developing interest by Canadian banks, many of the foreign banks with offices in Canada have considerable experience in consortium lending and are very anxious to initiate and participate in these types of loans. Their international connections could be useful and would also be significant in opening up a variety of foreign sources of funds. In August, 1981 the federal government established the capitalization for a number of foreign banks that are setting up operations in Canada under the provisions of the new Bank Act.

In looking at the investment requirements of the energy sector over the coming decade and how they are likely to be financed, attention has been devoted mostly to the petroleum and electric power industries. Coal and uranium mining have not been dealt with in any detail. There are special considerations with respect to the development of production of these two commodities as inputs for electric power generation. Long-term contracts for the purchase of uranium have been made between Ontario Hydro and Rio Algom and Denison Mines extending to 2011. Similarly, contracts have been made with western Canadian coal mining firms and arrangements have been made on a long-term basis for the movement of coal to its points of use in Ontario. In western and eastern Canada, where coal is used to generate electric power, the coal mines are either owned by the electric utilities or the coal is mined for them under long-term contracts. There are also requirements for the financing of coal and uranium exports. In British Columbia, and to a lesser extent, Alberta, in addition to the present exports of metallurgical coal, a number of new projects are under construction or are planned for the combined export of metallurgical and thermal coal or for thermal coal alone. The financing would be supported by long-term contracts, usually with Japanese or Korean companies that would also be prepared to participate directly in the financing of the required capital investment.

5.2 The Impact of New Energy Policies

The role of government has become a pervasive influence in energy sector activities. For many years electrical

generation and distribution has been subject to public utility regulation pertaining to price and investment decisions and in most provinces Crown corporations are the predominant entities. More recently, other aspects of energy production and distribution have seen an increasing role of government, with consequent effects on the financing of investment. The Foreign Investment Review Agency must approve the arrangements for foreign participation before a project can proceed as, for example, in some of the projects planned to export coal from western Canada. In the case of the financing of mega projects, the extent of government regulation is such that it frequently brings in a host of federal and provincial government agencies concerned with energy, environment, transportation, finance and other matters. Obtaining project approval thus has become an expensive and time-consuming process, subject to many uncertainties. In the case of prospective new oil sands projects, the Government of Canada in its September 1981 accord with Alberta, agreed to a 'single window' for matters relating to new projects in an attempt to expedite the process.

The myriad activities of government will attenuate the influence of the various factors affecting the financing of energy investment that were considered in the preceding section. In fact, some of the changes that are already beginning to appear were stimulated by the National Energy Program. As outlined on October 28, 1980, it contained proposals for extensive changes in almost every facet of Canadian energy policy. After 10 months of uncertainty, the agreements of September 1981 between the federal and Alberta governments and the federal and British Columbia governments clarified considerably the degree to which the program would be implemented. It also modified the NEP in certain respects. Negotiations with other provinces are still underway. Some of its potential effects have become clear, even though the magnitude still remains uncertain. For purposes of this study, the following elements appear to be significant:

- oil prices to consumers are to go up as rapidly or perhaps more rapidly than projected in analyses preceding the NEP, but the increases are due more to taxes than previously anticipated;

- the very extensive reduction in oil consumption by 1990 projected in the NEP is unlikely to be achieved, but a number of measures over and above the increased prices to consumers could result in greater shifts to natural gas and electricity than contained in earlier projections;

- earned depletion allowances will be phased out and a system of incentive grants introduced;

- the overall mix of prices and taxes for old oil (pre-1981) from conventional sources is such that little of the increased revenue from price rises is left with the producer;

- for new oil, producer prices and incentive grants are intended to be sufficient to encourage the development of conventional and non-conventional sources as well as oil from frontier areas;

- all of the above is to be achieved with a set of policies that would yield a greater share of the revenue to the federal government through the introduction of major new taxes, including a petroleum and gas revenue tax, a tax on domestic natural gas sales and an incremental 'old oil' revenue tax;

- in addition, an increased role for Canadian-owned and controlled companies is to be achieved through (a) more attractive incentive grants for Canadian-owned firms, (b) a policy of government purchase of foreign-owned oil companies, (c) a reservation to the Crown of a 25 percent interest in every right on Canada lands, and (d) a requirement of a minimum 50 percent Canadian ownership for any production from Canada lands.

While negotiations between the federal government and several of the provinces continue and the necessary legislation has yet to be adopted by Parliament, it is evident that the general thrust of the NEP, including its September 1981 modifications, will be the basis of policy. What then are the potential implications for the financing of energy investments?

A number of analyses of the NEP were carried out in the early months following its announcement, and in almost all instances they concluded that the effects on cash flow of

existing oil companies operating in western Canada will be such that reductions in investment in exploration and development would occur.[5] Some companies, however, moved to establish a basis for increased investment activity in the future, perhaps on the assumption of a substantial eventual modification of certain aspects of the NEP. In fact, the potential netback for new oil was increased through the price changes made in the September 1981 agreement with Alberta. Also, some firms with a major part of their activities in western Canada have been re-organizing to meet the Canadian ownership requirements for the new incentive grants that are replacing the fiscal incentives. Other companies, the most notable of which is Dome Petroleum, have been rearranging their affairs to obtain the 80 percent incentive payments available to Canadian-owned firms operating on Canada lands. While in the case of Dome Petroleum the arrangement involved setting up a new company, Dome Canada, other Canadian-owned companies are extending their activities to frontier areas including Coseka Resources, Teck Corporation, Sulpetro, Clarion, Husky Oil, Roxy, L. K. Resources, Norcen Energy Resources and CDC Oil and Gas, owned by the Canada Development Corporation.

While it is difficult to reach any firm conclusions at this stage, it is apparent the overall investment in oil and gas exploration has been reduced during 1981 as extensive restructuring of the industry has been underway. Companies have been adjusting the ownership of assets in order to be in a position to take advantage of the favourable treatment of Canadian firms in the NEP. With much of the land holdings in the hands of foreign-owned firms, considerable potential development will be delayed until new arrangements are completed.

As to sources of funds to finance oil exploration and development in Canada, the NEP has made it very difficult to attract foreign equity funds. At the same time, through such purchases as those of Petrofina by Petro-Canada and of Aquitaine by the Canada Development Corporation, Canadian savings are being used to repurchase existing assets from foreign shareholders rather than to use the savings to invest in new assets. To the extent that the payment is made by increasing the price to oil consumers through a special tax, the ability of consumers to save and invest in other assets

is reduced. A similar process occurs when private corporations purchase the assets of other foreign-owned oil companies, although in this instance it is private corporate saving that is being used in this way. Thus, whether the acquisition is by a public or private corporation there is a net outflow of saving to non-residents. It has been estimated that takeovers worth more than $6 billion occurred from when the NEP was announced to the end of July 1981.[6] The net outflow comes on top of the other measures in the NEP which make access to non-resident saving more difficult.

The net effects of these various measures in the NEP, therefore, will likely be some reduction in the amount of foreign funds used to finance energy investments and an accompanying reduction in investment in the oil and gas industry from this source.

The domestic sources of financing on which the industry will have to rely include sources internal to oil and gas and other companies and external funds. It has already been noted that, with very strong growth of investment over the coming decade, it can be expected that firms in the Canadian economy as a whole will have to increase the proportion of financing that is derived from sources external to the firms. Already, since 1976 in the petroleum industry external financing has risen to account for 34 percent of the funds required for investment. (See Chapter 4.) With the new pricing, royalty and tax arrangements that are now in place for old oil, and the limited prospects for rapid increases in revenue from natural gas sales[7], there will be little increase in cash flow to oil and gas companies in the immediate future and most of the firms will have to rely heavily on external sources of funds for investment in new oil production. In addition to the financing problems outlined above, smaller firms will have difficulty in acquiring the expertise to cope with the complex machinery being established to administer various aspects of the NEP. As all firms, small and large, strive to take advantage of the investment opportunities in new sources of oil, one can expect them to first make use of bank financing and then to issue new bonds or shares if the circumstances are appropriate. Firms engaged in large projects can be expected to turn to project financing so as to preserve their limited cash flow and borrowing capacity for other projects.

It is now evident that prices of oil to consumers will rise quite rapidly, encouraging a considerable shift to natural gas and electricity. Most of the investment projections have included provision for extension of the gas pipelines to eastern Quebec and the Maritimes and to Vancouver Island. Greater investments may be required for distribution of natural gas to final consumers. Also, it may turn out that the growth in electricity use will be greater than projected; this would have the effect of raising investment requirements for electricity generation and distribution in the latter half of the 1980s over what is now generally anticipated.

McKinnon of Calgary Power indicated that the investment requirements in the electrical sector to 1990 could amount to $160 billion[8], considerably above the $130 billion projection for the utilities referred to in Chapter 2. (See Table 2.4.)

If investments for electricity generation and distribution and gas distribution are even higher than expected, the utilities will face a formidable challenge to raise the capital. The utilities raise most of the funds outside of the corporation, and have traditionally relied on the long-term bond markets in raising funds. If, as in the past, they raise a considerable proportion of the funds in foreign markets, they would be drawing on non-resident saving, perhaps offsetting to some degree the earlier tendencies noted for a decline in the use of foreign funds in the primary oil and gas industry.

5.3 High and Variable Inflation and Interest Rates

At the beginning of this chapter a general setting was outlined in which inflation abates somewhat during the 1980s and interest rates moderate. What problems will be encountered in the financing of energy investments if rates of price increase are erratic and generally high and interest rates remain high and difficult to forecast?

This is a real cause for concern. The Economic Council of Canada, in its spring 1981 reassessment of the medium-term outlook[9], projected a rate of rise in the Consumer Price Index that averaged over 11 percent to 1985, nearly 2 percentage points higher than the base case in its

Seventeenth Annual Review. The recent energy pricing and taxation agreement between the federal and Alberta governments would tend to further increase the projected rate of price rise.

The NEP is already necessitating the re-evaluation of many investment projects. Many of the prospective sources of energy to be developed are capital intensive, either in their production or distribution, including the oil sands, natural gas pipeline systems and electricity, all of which entail investments that have to be made well in advance of production. Exploration and development of frontier oil where facilities for production and transportation are not yet in place similarly will involve heavy capital expenditures prior to the commencement of production.

As interest rates rise, firms evaluating projects according to discounted cash flow will turn away from projects with long lead times unless prices are expected to rise very rapidly. If a project is one of many being undertaken by a firm and the financing is mainly from internal cash flow, the uncertainties concerning future changes in prices, costs and interest rates might not impede it being undertaken. Its chances would also be enhanced if it appeared to represent the development of one of the least costly sources of additional energy production. Even in this case, however, a project with capital costs well in advance of production is likely to be delayed. Prices of oil, gas and electricity are regulated while costs are not.

Mega projects are even more likely to be delayed or abandoned if interest rates remain high. In the case of the large projects such as oil sands plants, heavy oil upgrading plants and pipelines, the project must stand on its own in terms of assessment of its financial feasibility. It is not part of an investment program in which the risk of the total is less than the risks associated with the individual components. For project financing, lenders will make funds available only if the project itself is financially attractive. Furthermore, expectation of inflation but uncertainty concerning its rate could cause interest rates to rise more than sufficient to compensate lenders, with a rise in the 'real' rate of interest to compensate for the increased uncertainty. Rises in interest rates will increase the total

costs of the project because of the need to raise and invest capital for several years in advance of production. This has been one of the important factors causing increased cost estimates for oil sands projects to the $10-12 billion range and of the total Alaska Natural Gas Pipeline project to an estimated $30-40 billion.

The effects of continued high rates of inflation and interest rates on the types of financial instruments used could be quite dramatic. Long-term bonds would remain difficult to sell. Already, utilities are being obliged to raise funds with shorter terms. For example, Hydro Quebec's U.S. dollar bond issue in September 1981 had a ten-year term. In addition, new instruments are beginning to appear. Short-term preferred shares have recently been issued by TransAlta Resources, with a term of up to 360 days. Such instruments still leave the borrower with uncertainty concerning costs in the same manner as variable rate bank loans or other variable-rate arrangements.

5.4 Concluding Comments

The examination of the prospective sources of finance for energy investments as a whole leads one to the conclusion that the ingenuity of those responsible for raising the funds is going to be severely taxed. Adding to the already difficult task associated with the huge magnitude of the investments to be financed are the challenges to be met in adjusting to the changed energy policies and the uncertainties to be faced because of interest rate fluctuations. Some projects will have to be delayed or abandoned. This is not surprising. What is troubling, however, is that because of the attempts to assure that certain investments take place, encouragement may be given to more costly rather than less costly sources of energy.

One of the risks associated with the National Energy Program and the associated agreement with Alberta is that this manner of establishing forward prices may be too rigid. If inflation and interest rates remain high, the increases in oil production necessary to achieve self-sufficiency may be slow in coming. This would leave Canada exposed to the vagaries of international oil prices. For the next few years such vulnerability may not be too worrisome. It could,

however, result in the extension of measures to encourage the development of particular domestic sources of oil. The danger then exists of providing even more encouragement to the more costly sources, as was very evident in the NEP prior to the September 1981 changes.

For the near-term future, it is apparent that increases in the internal cash flow of petroleum companies will be severely limited, given the heavy taxation of windfall profits on 'old oil' and the modest rise in the domestic price of natural gas. External sources of funds are going to be required to a greater degree than in the past. Foreign sources of saving will be difficult to attract for petroleum industry investments in Canada although they will continue to represent a major source of funds for electric utility investments. Furthermore, with a heavy use of domestic saving to finance the purchase of existing oil industry assets, the search for sources of funds external to the firms may encounter difficulties. Some new sources may exist, including the Alberta Heritage Savings Trust Fund, for which there has been a recent announcement that it would begin to acquire shares in Canadian companies. The cooperative movement has indicated that it is prepared to invest in the oil and gas industry. Firms are prepared to issue new shares to tap these and other sources when conditions permit new issues.

It is evident, however, that we may be attempting to do too many things at once. Canada is beginning to develop new sources of energy that are much more costly than the sources previously used. At the same time, funds are being used to acquire the assets of foreign-owned oil companies. This latter process may have to be slowed if Canadians are unwilling to increase markedly their rate of saving.

Footnotes

[1]For an examination of influences affecting the level of personal savings, see Janet Jarrett, Personal Savings in Canada: An Analysis of Recent Trends, The Conference Board of Canada, 1981.

[2]As reported in The Globe and Mail, May 4, 1981.

[3]See article on Lamond in Canadian Business, March 1981.

[4]For additional discussion of project financing, see "Project Financing--Banking's Response to a New Environment", R. Neil Benson, The Canadian Banker, December 1980.

[5]See, for example, After Tax Profitability of Oil and Gas Ventures, James A. Lewis Engineering Co., Calgary, Alberta, March 25, 1981. This analysis concluded that returns to all companies, whether Canadian or foreign-owned, would be inadequate to encourage investments in the oil and gas industry in Western Canada.

[6]Globe and Mail, August 1, 1981.

[7]While the removal of the tax on natural gas exports may have some effect, rapid increases in export sales are unlikely at the present time. For the longer run, the recent report by the National Energy Board, Canadian Energy Supply and Demand 1980-2000, June, 1981, gave little encouragement to increased export permits.

[8]Remarks by F.A.R. McKinnon, Vice-President, Finance, Calgary Power, to a Canadian Electrical Association seminar in Calgary, as reported in The Globe and Mail, March 10, 1981.

[9]R. S. Preston et al, The Medium-Term Outlook: Spring 1981 Reassessment, a paper prepared for the Economic Council of Canada, June, 1981.

APPENDICES

APPENDIX A

PROSPECTIVE ENERGY INVESTMENTS AFTER TAKING COST INCREASES INTO ACCOUNT

In Chapter 2 the information on energy investment was mostly presented in constant 1971 dollars. This is appropriate where the main interest centres on the factors affecting the long-term growth of the economy. When cash flows of profits or financial flows in the economy are under consideration, however, the use of current dollar expenditure totals is more appropriate.

Projection of these 'as spent' dollar expenditures brings increases in costs into the picture. Since costs of different components of gross national expenditure have been increasing at different rates, with average investment costs increasing more rapidly than the average of all costs in the economy, the total investment as a percent of GNP that is projected is even higher when measured in current dollars. (Compare Table A.1 with Table 2.4.)

Furthermore, since energy investment costs are expected to continue to rise more rapidly than investment costs generally, at least in part because of the heavy emphasis on construction-type activity where the rate of cost increase has been greater than for machinery and equipment investments, energy investment as a percentage of total investment is greater when measured in current than in constant 1971 dollars. The different rates of cost increase also influence the percentage distribution of the energy investment.

There have also been regional variations in increases in construction costs, with costs rising more rapidly in regions where oil and gas projects are located. For example, the price index for non-residential building construction for the Prairie provinces averaged 244 in 1980 (1971=100) as compared with 234 for all Canada. For the labour component the index was 259 as compared with 238. For 16 construction trades, the average index of union wage rates, including

supplements (1971=100) stood at 265 in Edmonton, 327 in St. John's, 243 in Montreal, and 233 in Toronto.[1]

TABLE A.1

ENERGY INVESTMENTS, ECONOMIC COUNCIL OF CANADA BASE CASE, 5-YEAR TOTALS

	1981-85		1986-90	
	Billion Current Dollars	Per-Cent	Billion Current Dollars	Per-Cent
Crude Petroleum and Natural Gas	70.4	50.2	152.6	59.5
Petroleum and Coal Products Manufacturing	2.8	2.0	6.8	2.7
Pipelines	14.1	10.1	12.7	5.0
Coal	1.6	1.1	2.3	0.9
Electric and Gas Utilities	51.3	36.6	81.9	32.0
Total Energy	140.2	100.0	256.3	100.1
Percent of Total Gross Fixed Capital Formation		27.6		28.5
Total Investment as Percent of GNP[a]		25.8		27.0

SOURCE: Material prepared for 17th Annual Review, Economic Council of Canada, 1980.

[a]Total Investment also includes inventory accumulation.

[1]Canada, Statistics Canada, Construction Price Statistics, Catalogue 62-007, monthly.

APPENDIX B

TABLE B.1

FINANCIAL FLOWS: NON-FINANCIAL PRIVATE CORPORATIONS
(millions of dollars)

	1965	1966	1967	1968	1969	1970	1971	1972
1. Gross Domestic Saving	5,318	5,708	5,995	6,495	6,805	7,169	7,~15	6,480
Capital Consumption Allowances	3,272	3,585	3,825	4,063	4,441	4,954	5,102	5,715
Net Domestic Saving	2,046	2,123	2,170	2,432	2,364	2,215	2,313	2,765
2. Non-Financial Capital Acquisition	7,204	8,037	7,048	7,521	8,967	9,446	10,407	11,911
Gross Fixed Capital Formation	5,987	7,052	7,009	7,079	8,333	9,077	10,035	11,249
Value of Physical Change in Inventories and Purchase of Existing Assets	1,217	985	39	442	634	363	372	662
3. Net Increase in Financial Assets	2,893	2,876	2,515	2,900	2,348	1,940	3,883	3,390
Receivables	1,487	1,252	1,004	938	851	1,098	1,739	1,613
Loans	-	134	106	-82	-109	-98	-4	8
Claims on Associated Enterprises	583	534	536	632	614	976	667	971
Other Assets	823	956	871	1,412	992	-36	1,501	996
4. Net Financing Requirement (3 + 2 - 1 + discrepancy)	4,944	5,405	4,057	4,161	4,976	4,096	6,834	5,622
5. Financed by:								
Payables	1,181	900	403	237	597	288	1,232	1,660
Loans	878	919	840	347	1,008	272	1,450	1,975
Short-Term Paper	35	131	137	160	292	60	320	-238
Claims of Associated Enterprises	311	778	483	700	107	682	357	302
Mortgages	654	806	667	596	914	499	530	336
Bonds (net)	944	873	927	667	740	1,369	1,698	863
Share Capital	703	656	633	862	1,378	846	704	454
Other	240	343	167	592	-60	78	543	270
6. Discrepancy	167	301	489	235	446	-117	159	-1,199

	1973	1974	1975	1976	1977	1978	1979	1980
1. Gross Domestic Saving	10,731	12,119	13,207	15,837	16,972	18,680	24,189	26,770
Capital Consumption Allowances	6,688	8,098	9,169	10,457	11,711	12,681	13,871	15,290
Net Domestic Saving	4,043	4,021	4,038	5,380	5,261	5,999	10,318	11,480
2. Non-Financial Capital Acquisition	14,870	19,583	16,425	20,548	21,610	23,709	31,261	32,285
Gross Fixed Capital Formation	13,418	16,213	17,461	20,082	21,701	23,852	27,640	31,806
Value of Physical Change in Inventories and Purchase of Existing Assets	1,452	3,370	-1,036	466	-91	-143	3,621	479
3. Net Increase in Financial Assets	6,384	8,994	6,559	5,610	8,729	17,079	19,288	19,934
Receivables	3,210	5,175	3,855	2,238	3,794	8,192	7,857	6,500
Loans	79	97	204	-130	480	556	361	187
Claims on Associated Enterprises	1,177	1,967	1,194	1,452	2,926	3,768	6,935	7,041
Other Assets	1,918	1,755	1,306	2,050	1,529	5,363	4,875	6,206
4. Net Financing Requirement (3 + 2 - 1 + discrepancy)	9,095	16,133	10,822	10,819	13,382	23,378	28,068	30,184
5. Financed by:								
Payables	2,315	4,857	2,523	1,177	1,960	5,701	6,620	6,561
Loans	3,335	3,713	3,345	3,690	2,044	4,826	7,345	8,090
Short-Term Paper	-177	1,463	212	353	-409	677	994	11
Claims of Associated Enterprises	173	871	661	1,103	1,733	1,466	2,825	2,936
Mortgages	320	500	332	757	493	1,257	870	1,748
Bonds (net)	750	1,457	2,112	2,132	1,983	1,563	474	2,141
Share Capital	1,118	828	1,161	927	2,675	4,782	5,260	5,564
Other	1,261	2,444	476	680	1,883	3,306	4,679	3,194
6. Discrepancy	-1,428	-325	1,045	1,498	-985	470	1,798	4,735

SOURCE: System of National Accounts, Financial Flow Accounts, 1961-1979, Statistics Canada 13-563 Occasional, and Fourth Quarter, 1980, 13-002.

APPENDIX C

TABLE C.1

SELECTED LARGE COMPANIES IN THE PETROLEUM INDUSTRY: SOURCES AND USES OF FUNDS

	Millions of Dollars									
	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total Internal (P.N.E.)	1,251	1,505	2,055	2,518	2,698	2,931	3,631	4,148	6,006	7,515
Minus Dividends	172	195	267	360	430	344	424	473	688	832
Total Internal Sources	1,079	1,310	1,788	2,158	2,268	2,587	3,207	3,675	5,318	6,683
External Sources:										
Long-Term Debt (Net change)	29	63	-1	77	254	425	296	589	1,235	1,432
Equity (Net change)	43	-14	70	-42	-39	-137	123	104	265	922
All Other	90	75	74	42	479	229	338	914	1,044	782
Total External Sources	162	124	143	77	694	517	757	1,607	2,544	3,136
Total Funds	1,241	1,434	1,931	2,235	2,962	3,104	3,964	5,282	7,902	9,819
Used For:										
Capital Expenditures -										
Total Petroleum	1,079	1,103	1,375	1,644	1,889	2,111	2,822	3,306	4,251	5,650
Other Canadian	35	25	45	62	132	179	244	217	388	413
Foreign	35	51	135	146	224	228	207	515	366	653
Total	1,148	1,179	1,555	1,853	2,244	2,518	3,273	4,041	5,127	6,716
Other Uses:										
Working Capital Increases	47	158	219	247	449	244	372	508	1,392	2,042
All Other Uses	45	97	154	133	267	342	320	734	1,383	1,061
Total Uses of Above Funds	1,240	1,434	1,928	2,233	2,960	3,104	3,965	5,283	7,902	9,819

SOURCE: Canadian Petroleum Monitoring Survey, 1980, adjusted to reduce internal sources by the amount of dividends paid, and to take net increases in equity and long-term debt, rather than the gross increases as funds raised. Working capital decreases were also netted out against increases, which appear in the uses of funds raised.

TABLE C.2

ELECTRIC POWER UTILITIES: SOURCES AND USES OF FUNDS

	Millions of Dollars								
	1970	1971	1972	1973	1974	1975	1976	1977	1978
Sources:									
Non-Cash Charges to Income	281	307	378	424	444	473	533	610	709
Net Income Less Dividends	229	239	239	308	418	294	464	721	889
Total Internal Sources	510	546	617	732	862	767	997	1,331	1,598
Long-Term Debt (Net Increase)	897	1,007	1,171	1,233	1,588	3,266	4,461	3,708	4,261
Equity (Net Increase)	0	0	0	44	43	109	160	123	117
Other Sources	114	103	92	118	60	151	178	288	73
Total External Sources	1,011	1,110	1,263	1,395	1,691	3,526	4,799	4,039	4,451
Total Sources	1,521	1,656	1,880	2,127	2,553	4,293	5,796	5,370	6,049
Uses:									
Capital Expenditures	1,477	1,533	1,675	2,082	2,490	3,978	4,380	5,178	6,140
Increase of Working Capital	-38	-210	72	-78	-23	-31	1,325	-133	-272
Other Uses	73	334	133	123	87	346	93	325	181
Total Uses	1,520	1,657	1,880	2,127	2,554	4,293	5,798	5,370	6,049

SOURCE: Derived from material obtained from Energy, Mines and Resources Canada.

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